

What is Claimed is:

1. A cooling/heating system of air conditioner comprising:

a duct having a first passage for drawing external air, and a second passage for drawing room air, the second passage having a part crossed with the first passage;

5 a regenerative heat exchanger having first and second flow passages in the crossed part of the first and second passages for indirect heat exchange between the external air and the room air;

a case connected to the first and second passages of the duct having first and second outlets for drawing/discharging external and room air;

10 first and second fans for drawing in the external air and the room air into the case through the first and second passages, and discharging the external air and the room air through the first and second outlets; and

first and second heat exchangers for heat exchange with the external air and the room air discharge through the first and second outlets.

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2. The cooling/heating system as claimed in claim 1, wherein the regenerative heat exchanger includes the first flow passages and the second flow passages stacked alternately.

20 3. The cooling/heating system as claimed in claim 2, wherein the first and second flow passages are formed of aluminum.

4. The cooling/heating system as claimed in claim 2, wherein the regenerative heat exchanger includes;

a plurality of corrugated plates stacked to cross each other alternately to form the first flow passages and the second flow passages, and

a flat plate between adjacent corrugated plates for separating the first and second flow passages.

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5. The cooling/heating system as claimed in claim 4, wherein the first flow passage is in communication with the first passage, and the second flow passage is in communication with the second passage.

10 6. The cooling/heating system as claimed in claim 1, wherein the first and second fans are mounted between respective passages and outlets.

7. The cooling/heating system as claimed in claim 6, wherein the fans are mounted in the case.

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8. The cooling/heating system as claimed in claim 1, wherein the first and second heat exchangers of the heat pump system are mounted opposite to the first and second outlets of the case.

20 9. The cooling/heating system as claimed in claim 1, wherein the case includes first and second spaces formed therein divided with a semipermeable membrane for permeation of moisture only, the first and second spaces being filled with desiccant; and

first and second pumping system connected between upper parts and lower parts of the spaces for pumping the desiccant to the upper parts of the spaces, respectively.

10. The cooling/heating system as claimed in claim 9, wherein the desiccant is silica gel.

5           11. The cooling/heating system as claimed in claim 9, wherein the first and second pumping systems are mounted so as to be respectively in contact with the first and second heat exchangers thermally.

10          12. The cooling/heating system as claimed in claim 11, wherein the first and second pumping systems include;

              first and second pipelines connected between the upper parts and lower parts of the first and second spaces to form flow passages of the desiccant and to be in contact with the first and second heat exchangers thermally, and

15          first and second pumps on respective pipelines for pumping the desiccant to the upper parts.

              13. The cooling/heating system as claimed in claim 12, wherein the first and second pumping systems are mounted on upper parts of the first and second pipelines.

20          14. The cooling/heating system as claimed in claim 9, wherein the first space is in communication with the first passage for drawing the external air, and the second space is in communication with the second passage for drawing the room air.

              15. The cooling/heating system as claimed in claim 9, wherein the first and second

outlets are formed, and the first and second passages of the duct are connected to parts, above the level of the desiccant filled in the first and second spaces.

16. The cooling/heating system as claimed in claim 15, wherein the first and second  
5 fans are mounted between the first and second passages of the duct and the first and second outlets.

17. The cooling/heating system as claimed in claim 9, wherein the regenerative heat exchanger includes the first flow passages and the second flow passages stacked alternately.

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18. The cooling/heating system as claimed in claim 17, wherein the regenerative heat exchanger includes;

a plurality of corrugated plates stacked to cross each other alternately to form the first flow passages and the second flow passages, and  
15 a flat plate between adjacent corrugated plates for separating the first and second flow passages.

19. The cooling/heating system as claimed in claim 18, wherein the first flow passage is in communication with the first passage, and the second flow passage is in communication  
20 with the second passage.

20. The cooling/heating system as claimed in claim 9, wherein the first and second heat exchangers of the heat pump system are mounted opposite to the first and second outlets of the case.